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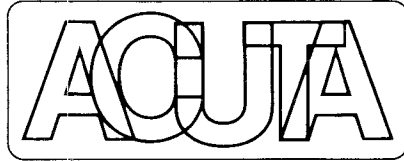


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*For office Review
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NEWS

Association of College & University Telecommunication Administrators

THE VOICE OF TELECOMMUNICATIONS IN HIGHER EDUCATION

VOLUME 12, NUMBER 7

JULY 1983

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ASSOCIATION OF COLLEGE AND UNIVERSITY
TELECOMMUNICATIONS ADMINISTRATORS

1983



TWELFTH ANNUAL CONFERENCE
JULY 24-28, 1983
UNIVERSITY OF COLORADO, BOULDER

The Hilton Harvest House Hotel

For administrators, managers and telecommunications related personnel. You'll learn the latest on such topics as:

- Communications Preplanning for the Modern University Building
- Electronic Mail & Voice Mail
- Interconnect
- Resale of Long Distance Services
- Cellular Radio and Paging
- Hospital Communications Services
- Personal Computers on a College Campus
- The Developing Role of Women in Telecommunications
- Baseband & Broadband Local Area Networks
- Teleconferencing
- Trends in Digital PBX and Key Systems
- Dormitory Telephone Service
- Future of Centrex
- Computer Controlled Radio Paging and Message System

DIRECT INQUIRIES TO CONFERENCE HOST:

Joyce Dodson
ACUTA Conference
Campus Box 373
University of Colorado-Boulder
Boulder, CO 80309
(303) 492-5621

General Registration: Sunday July 24, 1:30pm
Reception: Sunday July 24, 6:30pm
Last Scheduled Event: Thursday noon lunch

PARTY LINE

—Ruth Michalecki, Nebraska

During these past few weeks of a very busy summer, I have wished many times over that the word "deregulation" would banish from our language. Life was a lot simpler prior to deregulation, at least for me....now I have only challenging opportunities!

At a recent ICA Meeting, Howard Anderson, president of the Yankee Group consulting firm, advised corporate communications managers to "build your own Bell"... Think of yourself as a corporate asset, rather than a cost center, he said. You should be looking like a mini-telco, owning your own switch, taking advantage of the many opportunities to provide various services to your customers and working "WITH" the Bell Companies, not simply "THRU" them... (Ditto-Universities).

At this same meeting, Dr. H. Charles Baker of Telecommunications Engineering, discussed some interesting statistics demonstrating the changes in corporate telecom networks. A survey of 237 ICA members in 1981 showed: 1) average annual telephone billing was \$20million & rising, 2) ratio of annual telcomm expenditures to gross revenues (both large & small companies) was 0.7%.

John Haas of Hay Associates also noted the changes in the status of corporate telcomm managers. They are moving up the ladder, getting higher titles, increasing staff and becoming more specialized. Note---this was for corporate telecommunications managers...

+++++

I read where yet another major company has entered the telecommunications service market. NCR Corp, has announced their entry under the name of Telecommunications Services, Inc., with three basic offerings---2 interexchange networks and a call detail recorder. Both of the networks will resell time on transmission facilities NCR has obtained from AT&T. Their "ThriftyCall Card" Service will offer residential & business users service based on an annual subscription fee, with no time restrictions or minimum use restrictions. Their second network is a dedicated voice and data service between specific cities. The call detail offering is called "Calltrack", is compatible with any PBX having an RS-232 communication port, uses Pascal software language.....

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Action/Honeywell has introduced a new version of their Roadrunner---The Digital Edition 4000. It can interface with virtually any PBX, are typically used to replace EPSCS, CCSA, & ETN Networks and they can provide dynamic allocation of T-1 channels.

+++++

SEE YOU IN BOULDER!

ANOTHER AT&T

...by Subrata N. Chakravarty

THE PAYOFF HAS long seemed just around the next bend, but Charles Wohlstetter believes he now can see it clearly. "Nineteen eighty-four," he says, "is the year of rewards."

He means rewards for his 22-year-old Continental Telecom (formerly Continental Telephone), or Contel. Wohlstetter, now in his 70s, founded the company in 1961 after a brokerage career on Wall Street. Wohlstetter was a student of the Prussian military's *Kriegspiel* (literally, "war game"), requiring contingency planning for war with every potential combatant. Wohlstetter's targets were the country's 4,600 independent telephone companies. He developed detailed profiles of all of them and calculated acquisition prices of each. With his homework done, Wohlstetter sortied by airplane into the independents' territories armed with Continental Telephone stock (which sold as high as 45 times earnings), offering good prices and quick decisions to small telephone company owners who would sell. Over the next seven years Contel bought 600 telephone companies, almost one every four days.

It was a promising start for a nascent telephone empire, but the long anticipated breakup of a far more powerful empire, American Telephone & Telegraph's, spelled trouble for Contel. Wohlstetter, nothing if not a contingency, saw it coming as early as 1975. Contel was getting 60% of its revenues from AT&T's toll settlement payments (the subsidy from the highly profitable long-distance business to local service). Those revenues would shrink after an AT&T breakup. To offset the shrinkage, local-service rates would have to rise sharply, slowing growth. Wohlstetter decided that he must reduce Contel's dependence on the telephone business, which at the time accounted for more than 90% of Contel's revenues. With the breakup of AT&T, he saw an opportunity to create a new AT&T by diversifying through the field of telecommunications.

With the help of Salomon Brothers, Contel chose to acquire rather than start its own new businesses. Wohlstetter, after all, created the company through acquisition. "You can start from scratch, which is very costly and very dicey," says Wohlstetter. "Or you buy a company that has the elements and you pay a little more, but you telescope time."

As a consequence, Contel now owns Executone, which commands about 35% of the non-Bell market for small-business private phone exchanges handling between 2 and 100 lines, and 10% of the non-Bell market for private branch exchanges of between 100 and 5,000 lines. CADO Systems, acquired this year, makes small business computers. Both companies ran into trouble last year with new product introductions, but Executone's \$4 million loss was more than offset by the profits from Contel Supply, a sales and distribution organization for telephone and computer equipment, and Contel Credit, a financing company. Both Executone and CADO are firmly in the black this year.

To exploit the big business and governmental telecommunications markets, Contel has two joint ventures with Fairchild Industries: American Satellite and Space Communications (Spacecom).

Contel picked up its 50% interest in American Satellite, which had run up heavy losses for years, at an adjusted book value of \$17 million. The satellite company sells teleconference, voice and data transmission services to big corporations, including Allstate and Lockheed, and provides facsimile transmission for the Gannett plants that print the new national daily, *USA Today*. Last year American Satellite turned profitable, earning \$2 million on \$44 million in revenues. The satellite firm should do far better this year. Because Wohlstetter "didn't like landlords," American Satellite, which leased from Western Union's Westar satellite system, bought 20% of that system.

Together with Fairchild, Contel also bought 50% of Western Union's Spacecom satellite system. Spacecom has a NASA contract to design and operate a data relay satellite system that will permit communications between other satellites and a single ground station. Contel and Fairchild have recently, bought the rest of Western Union's interest in Spacecom for \$11.5 million. Subsequently, for giving up its commercial exploitation rights to the relay system, Spacecom got \$35 million from NASA (of which Western Union will keep half as part of the buyout deal), additional NASA contracts, and elimination of any risk from possible cost overruns. The ten-year, \$2 billion NASA/Western Union contract stays with Spacecom. The deal should help Spacecom win other government work.

In addition, Contel has acquired firms in directory publishing, remote processing services and computer software packaging. And its construction group designs, builds and maintains communications systems, mostly abroad. The group returned to profitability last year after two years of losses on operations. Contel Page, the leading construction subsidiary, is bidding on big contracts with both American Satellite and Spacecom.

WOHLSTETTER SORTIED BY AIRPLANE INTO THE
INDEPENDENTS' TERRITORIES, OFFERING GOOD
PRICES AND QUICK DECISIONS TO PHONE COMPANY
OWNERS WHO WOULD SELL. IN SEVEN YEARS,
CONTEL BOUGHT 600 COMPANIES--ABOUT ONE EVERY
FOUR DAYS.

It all makes Contel one of the few companies able to compete head-on with AT&T in communications. "We can handle just about anyone's communications needs," says James V. Napier, Contel's longtime president who became CEO last month. "We can design a network, engineer it, construct it and install it. We can design the software to make the system work. We can operate it and maintain it."

But unlike its giant competitor, Contel will remain entrenched in basic telephone service. Some \$3.4 billion of its assets is employed in 1,900 phone systems in 38 states serving more than 2 million customers, mainly rural. Contel will spend \$2.6 billion over the next five years to modernize its exchanges, some of which still serve party-line customers. Higher telephone rates, based on the rates of return permitted by regulation rather than AT&T's toll settlements, plus new services made possible by modernization will, Napier says, finance the investment through

(Continued on page 3)

FROM THE BOARD

—Steve Harward

The 1983 Annual ACUTA Conference in Boulder, CO will officially conclude the twelfth year of ACUTA's existence as a professional organization. This is a particularly important milestone when one considers the significant events which have occurred in the telecommunications industry this year. Our efforts, both as professionals and as an organization, have been compounded by the transition which the regulated telephone industry is experiencing and by the array of new opportunities which face us.

In order to confront these challenges which lie ahead, it is mandatory that we continue to improve our skills in the areas of telephony, data communications, project management and interpersonal communications. As an organization, it is our responsibility to continue to offer ways in which our members can accomplish this often difficult task. I am personally gratified by the success of ACUTA 1982-83 workshops, ACUTA NEWS, and the many individual efforts which have enabled ACUTA members to improve their abilities as telecommunications managers. I applaud each of you who have chosen to participate in the activities or to assume additional responsibilities in ACUTA. Your efforts have contributed to the enrichment of the entire organization.

I hope that each of you have reviewed the Boulder Conference registration package and plan to attend this event. Joyce Dodson and Norm Sefton have devoted numerous hours to planning an excellent program for our Twelfth Annual Conference. I'll look forward to seeing you on July 24 in Boulder.



ACUTA President Steve Harward at Spring Seminar in Lexington, Kentucky.

ANOTHER AT&T (Continued from page 2):

internally generated cash and help Contel avoid adding to its already large debt.

In short, bigger profits from its newer businesses seem imminent, and the patience of Contel's shareholders may finally be rewarded, as Wohlstetter believes, next year. "We have everything in place," he says. "Now it's making the thing we have work and grow."

("Another AT&T" is reprinted from the June 20, 1983 issue of FORBES magazine.)

"MOUTH OF THE SOUTH"

—Norm Sefton, Duke University

Your old mouth of the south editor was reading the May, 1983 issue of Datamation and ran across an article entitled, "A PBX Cookbook" by Robert L. Patrick. Bob Patrick is the senior Datamation advisor and has been an independent computer consultant since 1959 and a regular contributor to Datamation. For the past few years, he has also been performing systems analyses in the telecommunications arena. His article entitled "A PBX Cookbook" hit a sore nerve in your old editor. I have been more or less preaching to whomever would listen to me that all telecommunications leaders need to wake up and smell the roses. I will not get on my soapbox again, but I would like to take a few moments to share with you a few of the paragraphs in Bob's article which illustrate the concern I have.

First off, this is the third part of a four-part installment and this particular article explains how to decide if a PBX is right for you. I would like to quote from Bob's article, with my comments in brackets.

"Perhaps because of the glitter of computers and our rampant budgets, office telecommunications has not received much attention in the last 20 years. (True.) Most industrial telephone systems are the responsibility of some administrator within a facilities and services organization. (True.) The costs of office telecommunications, until recently, have been fairly stable, the service offerings pedestrian and the manager's latitude limited by the offerings available from Ma Bell and her prosaic counterparts. (True.)

"In the 70's it became possible to buy equipment from any qualified vendor and connect it to the telephone network. (True.) Not many of us did because the troubles were large and the benefits were slight. (True.) In the 80's the balance changed and the benefits became more or less commensurate with the problem. Today important benefits became more or less commensurate with the problem. Today important benefits are clearly in sight, but a company needs talent, organization, and vision to reap those benefits. That's where the data processing manager comes in. (Here it comes.)

"Senior data processing personnel are acquainted with digital technology, are familiar with in-depth systems analysis, and are (more or less) comfortable running multimillion dollar projects in the limelight. (Stretching a point.) None of these three statements holds true for the current crop of telephone administrators. (You answer for yourself.) Thus, if the job is going to get done, the projects will probably have to be led by DP personnel. (Got the message.)

"The time will come in every organization when computing and telecommunications are merged. (True.) The question is only when and how. (True.) This article tells how to get going and enough decision points to allow you to start how and proceed as long as the decisions are favorable. Pauses can then be arranged as required until the situation changes and progress is once again practical.

"Before describing the opportunities and how to proceed with a telecommunications systems analysis, some words of caution are in order.

(Continued on page 5)

BELL SYSTEM'S BREAKUP IS JARRING THE UNIONS

Compared with other industrial workers, telephone company employees have weathered the worst economic slump in 40 years almost without pain. They have not been laid off in massive numbers, the average worker has received real wage gains of 1% per year since 1980, and American Telephone & Telegraph Co.--the industry's dominant employer--has not demanded "givebacks" from the Communications Workers of America and its two other unions. But this secure world will soon be turned upside down when the Bell System breaks up into eight independent companies. That will precipitate a potentially revolutionary change in labor relations and present problems for this year's contract negotiations.

The divestiture, which will occur in January, 1984, overshadowed all other issues as AT&T opened bargaining on May 19 in Washington with the CWA, the International Brotherhood of Electrical Workers (IBEW), and the tiny Telecommunications International Union (TIU). The CWA, which has 600,000 Bell System members and is by far the largest union, is seeking up to 3% annual wage increases, a richer cost-of-living adjustment (COLA), improved job security provisions, and other benefits. But the structure of bargaining in a divided Bell System will be the major issue in the talks. While a national strike is unlikely when the contracts expire on August 7, the negotiations will be the most contentious since national bargaining began in 1974.

The outcome of the talks will have far-reaching implications for the Bell companies and their 750,000 unionized workers in many ways:

STRUCTURE

The system of bargaining at the national level could collapse, raising the prospect of a more fractious relationship between telephone workers and their employers. The CWA and IBEW, in particular, want to maintain the system of bargaining for uniform wage and benefit improvements for all members, but the seven new regional holding companies may well press for company-by-company negotiations to keep down labor costs in the future. Such a system, however, could lead to more strikes. "I think there is a real likelihood there will be more labor strife in the next decade than there has been in the last 10 years," says CWA President Glenn E. Watts.

POLITICS

The divestiture may drag the bargaining process into the political arena. Large increases in local telephone rates are expected when subsidization of local service by long-distance charges ends, and that could set off a public backlash. Union leaders already fear that the public will blame the workers and their wages, not divestiture, for rate increases.

AUTOMATION

The unions' 90% share of the telephone work force could decline as increasing automation wipes out existing union jobs. At the same time, new and only partly unionized companies, such as MCI Communications Corp., will boost

their share of long-distance service. To meet that challenge, the unions are stressing job security and company-sponsored retraining for current workers as their principal contract demands.

Maintaining a national agreement is likely to be the first sticking point in negotiations. The Bell System units that AT&T will retain--Western Electric, Bell Labs, and Long Lines--as well as the newly formed subsidiary, American Bell, will probably continue to bargain nationally. But the new operating companies are expected to want out of the system.

"A lot of them are chafing at the bit to get out on their own," says Art Perry, director of the Telephone Dept. at the IBEW. "It's going to be extremely difficult to get them to agree to multiemployer bargaining."

AT&T and the Bell companies do not want to settle that issue in the 1983 negotiations. "We don't think the future structure of bargaining is something we need to address now," says Rex R. Reed, vice-president for labor relations at AT&T. But he makes plain that when the new agreement expires, all bets are off. Since the individual operating companies already hold the union contracts, he says, they will be free to determine how they want to bargain after divestiture takes place.

The length of the 1983 pacts, therefore, will be a major issue at the bargaining table. And the unions' leverage on this issue is limited. AT&T's 1974 decision to bargain nationally was entirely voluntary, and under federal law the CWA could not legally strike to retain it. And what the CWA regards as an inducement to keeping the current system--"We'd be willing to go for a contract longer than three years," Watt says--appears to run counter to AT&T's bargaining goals. "Looking to the future, there are uncertainties that would make the companies cautious on long-term agreements, as (Watts) characterizes them," Reed says. "Changes may need to be made as we move along."

STRONG ON WAGES

But if management holds most of the cards on the issue of national bargaining, the CWA and its fellow unions believe they are in a much stronger position on strictly monetary questions. They point to AT&T's record profits of \$7.2 billion last year and the requirement under the court-ordered divestiture that the new holding companies be in sound financial shape when they venture out on their own.

As a result, the CWA will seek both a multiyear increase in its base wage rates and improvements in its existing COLA. Under the current contract, telephone workers received a base wage of 3% in 1980, 1981, and 1982, and union officials say privately that a similar package would also be acceptable this time, in light of what they estimate as an annual productivity increase of 6% to 7% in the telephone industry. Currently, CWA members' wages average \$12 per hour, and such a package would add \$1.11 to the hourly rate over three years. (Fringe benefits add a further \$4.20 per hour to total compensation. This will rise as health-care costs escalate, and the unions' hoped-for pension improvements would increase it more).

(Continued...)

BELL SYSTEM'S (Continued):

Although AT&T officials decline to discuss wage and COLA demands, the outlines of the company's bargaining strategy are beginning to become clear. Two of AT&T's operations-equipment supplier American Bell Inc. and the Long Lines Dept.-face a new and hotly competitive market, and the company will insist that it cannot afford large increases. "We will want to examine our wages and benefits in relation to the new competitive environment, we will find ourselves in," Reed says.

For the first time, the operating companies will be directly involved in bargaining--as if divestiture had already taken place. Each of the seven newly created holding companies will have a representative in the talks--even though the companies do not yet exist. Many of these companies expect considerable difficulty in winning the large rate increases they are now seeking from state and local utility regulators, and this may become a bargaining issue. "I don't have any doubt the companies will say this is a problem," Watts says. "But when it comes to a final agreement, I don't think we'll have to settle for less."

But the union is worried that the public will fail to distinguish between the impact of divestiture and the terms of the new contract as they affect the politically sensitive issue of telephone rates. "There's always a possibility that the public will blame these increases on the workers," Watts says, even though "wages and the cost of labor are not the problem." To fend off such a reaction, the CWA is launching a \$500,000 media campaign designed to win public sympathy for Bell's workers--and to point out that divestiture was not their idea.

The union will also be seeking contractual changes designed to deal with the ever-increasing pace of automation and the introduction of new technology in the telephone industry. The CWA wants to strengthen union-management technology committees, first established in 1980, through which AT&T has provided up to six months' notice when new equipment is introduced.

LATE NEWS

Union officers complain that the information is delivered too late for them to have any meaningful voice in how the technology is installed and its impact on employment. And Watts would like the company to "share with the union its long-range 5- and 10-year plans, the same ones they give to the board of directors." AT&T officials seem cool to this idea, and union representatives admit it is unlikely to come about.

CWA leaders are, however, more confident that AT&T and the operating companies will give ground on the issue of retraining. They point to recent CWA contracts signed with GTE Corp. in California and elsewhere that contain comprehensive provisions for dealing with the impact of automation on workers.

Under those agreements, a worker who is laid off or transferred more than 50 mi. from home, because of automation or consolidation of operations, can receive severance pay or early retirement if eligible. If the worker wishes to relocate, GTE will pay up to \$3,000 in moving expenses; if he retires, the company will

continue company-paid medical benefits for up to four years. If an employee seeks a new career outside the company, GTE will pay up to \$3,000 over a two-year span for training. "This gives employees a hell of a lot of options they didn't have before," says John Browning, director of the CWA's independent telephone department.

But the impact of increasing automation and the introduction of competition in the telephone industry will change labor relations in uncharted ways. For example, CWA officials think they see a new attitude on the part of management at the new unregulated AT&T subsidiary, American Bell. This unit will compete in an unregulated AT&T market to supply telephone equipment of all kinds to residential and business customers. American Bell now has about 4,500 CWA employees, and its work force is expected to swell by an additional 30,000 after divestiture. "They appear to have a different attitude toward their work force," says John Carroll, executive vice-president of the union. They seem to have an attitude that "because we're competitive, we need to change the whole way we do things. It could very well cause serious problems."

"Bell System's Breakup is Jarring the Unions" is reprinted from the May 30, 1983 issue of BusinessWeek.)

MOUTH OF THE SOUTH (Continued):

Many of us in DP are more comfortable in the back office among our acronyms and our kin than we are dealing with the line managers who run corporations. (Their Achilles' Tendon.) Although we have done our jobs, kept abreast of our own rapidly changing technology, and fought annually for budgets and head count, we seldom get appointed to corporate committees that don't involve computing and don't often socialize with our noncomputing peers. (True--another vulnerable point.) Quite frankly, many of us are not known as multifaceted individuals with general management backgrounds. (True.) Thus the only way for us to sally forth, gain larger responsibility, and manage a broader class of service is carefully. (Slow but sure--not bad.) Bob then goes on to give his eight-phase recipe on how to go about obtaining a PBX on an interconnect basis.

The message is loud and clear, the DP people have recognized the importance of telecommunications to their development and are now educating themselves and their peers into our world. Bob has even given them a dictionary of words entitled, "How to Speak PBX." The message is clear to all telecommunications personnel; if we don't get off our "duffs" and get up into the mainstream, we are going to be cut off and left to drift in the raft while the DP people rule our telecommunications world.



"I'm stirring up a little trouble for AT&T. Care to add anything?"

© DATAMATION

THE SHAPE OF RINGS TO COME

...by Colin Covert

ON THURSDAY, JUNE 1, 1982, A delivery truck eased to a stop at Federal Communications Commission headquarters and a crew of workmen, per-spiking in the capital's summer heat, began to unload a mountain of Bell System documents totaling 57,600 densely worded pages. They were not, as passers-by might have imagined, lawyer's briefs protesting the vivisection of the communications network. Rather, they were a bid for one of the most appealing slices of the newly resectioned pie. Ma Bell was staking its claim to a key role in an exotic proposed communications system that may one day have us all speaking into our wrist watches a la Dick Tracy: cellular radio. Trucks from General Telephone & Electronics, MCI Communications Corporation, Western Union, Metromedia, Inc., and more than a hundred other firms were close behind.

"Cellular," as it's usually called, it hot. It's a fairly new communications technology that could greatly expand the capacity of radio channels to handle calls at lower cost than the limited and expensive wireless mobile phones in use now. Cellular could also compete with and in some ways outmode many present radio, telephone, and CB radio systems. Some analysts rate its growth potential equal to that of railroads in the 1860's, telephones at the turn of the century, or television in the 1940's. AT&T evidently agrees. It's already invested nearly \$200 million in cellular systems, and by 1986 Bell spokesman anticipate the phone companies' combined spending on the systems will amount to nearly \$1 billion more.

IF YOU'VE NEVER HEARD OF CELLULAR, don't feel lonely. Few people outside the telecommunications industry have. It's one of myriad technical advances tumbling out of research labs into the newly competitive marketplace at a dizzying rate. New developments like cellular, fiber optics, and computer networking promise enormous benefit to all but the most casual yakker, representing as they do exponential leaps in the amounts and types of information our communication system can carry. Some of them use the existing telephone system in surprising ways. Some bypass it entirely. Many have virtually nothing in common with Alexander Graham Bell's invention.

In order to understand the benefits of these new systems, it's necessary to know a little about the way old-fashioned phones work. Imagine the telephone system as a physical pathway--think of it for a moment not as a network of wires but as a road that can be expanded and improved, within certain structural limits. Like any road, its architecture and traffic rules were ordained by the requirements of its first customers, voice subscribers.

The way sounds are formed in the mouth and received by the ear dictated much of the phone system's design. The way most of the network transmits information mimics the wave forms of sound with variable electrical waves traveling along the telephone channels--the lanes, so to speak. Until recently those lanes did not have to be particularly smooth. We have a generous tolerance for error in comprehending human speech; garble a couple of words or toss in a

whisper of static and we can still understand most conversations.

Lately, however, a growing number of customers are lobbying for the rules of the road to be completely rewritten, for traffic to move in a series of "on" and "off" energy pulses rather than the traditional waves. To the computer community, the telephone transmission system is merely a corridor along which digitized electronic information can flow from place to place, a world-wide expressway along which one can push vast amounts of information in speed-demon bursts. And theirs is rapidly becoming the accepted viewpoint. Using phone lines to link distant computers blurs the once rigid distinctions between phone and computer. The resulting blend of capabilities represents a major turning point in the evolution of both industries.

FIBER OPTICS, CELLULAR RADIO, MICROVAVE.

THE FUTURE OF TELECOMMUNICATIONS IS MORE
THAN JUST TALK.

Where two or more computers are joined together, they form a "network"--a system that moves information at high speeds. The practical advantages of such interconnections are becoming well known as personal computers proliferate. Through the use of a modem (a device that converts the electrical wave signals into digital signals understandable to a computer, and vice versa), microcomputers can put users in contact with colleagues across the city or around the world. Linked to large time-sharing systems, such networks can give users access to data from their own company's central computers or any of approximately 1,500 commercial data bases, ranging in subject from newspaper articles to chemistry abstracts to court records to weather reports.

Another potentially important product of network technology is electronic mail--which simply means picking up and sending messages via computer. These messages can run the gamut from love letters to lengthy financial reports to 3-D graphic industrial diagrams to information from other programs. Computer mail also costs less than paper mail. According to one estimate, it costs \$6 to produce and mail a standard business letter within the United States. Because it eliminates most of the paperwork and all of the postage, producing and sending the same letter by electronic mail can run as little as 50 cents. Best of all, it can be delivered in a split second. Neither rain nor snow, etc.

The market for such services exists today. According to International Resource Development, Inc., a Norwalk, Connecticut, research firm, about 15 percent of today's microcomputers use modems or other data interface devices, and the number will steadily climb toward 100 percent. In the office automation market, IRD predicts a similar proliferation of modems and local network systems (the technical term for the collections of wires and associated electronics that tie together small groups of microcomputers). Once suitably wired together, computerized offices, labs, or classrooms can share

(Continued...)

THE SHAPE OF RINGS TO COME (Continued):

information and access to printers and other peripheral equipment.

THE WRITING IS ON THE PHONE system's wall. If it is to capture the growing computer communications market, it must adapt, and quickly, along two lines: Move the information faster, and improve accuracy of transmission.

First, speed: The reason people invest thousands of dollars in computers is that they speed routine chores to a rapid conclusion. Typical personal computer modems can now push a maximum load of 1,200 bits of information per second across telephone lines (approximately four typewritten pages a minute). Competing communications links like Ethernut, Xerox's local network for offices, can transfer 10 million bits of information per second via a shielded cable that runs between machines. In the highway metaphor we used earlier, phone lines are ox carts; Ethernet-type systems are bullet trains. Today, few computer users need systems as expensive and sophisticated as Ethernet. But that need may not be far off.

Second, accuracy: Computers are sticklers for it. Their creators began to lock horns with the communications industry over the issue of data transmission in the 1950s. Computers require exacting standards of transmission, insisted the bright young engineers of Univac, Honeywell, and IBM. One dropped digit due to a noisy long-distance line or a faulty junction box could garble reams of high-speed computer communications. Sorry, replied Bell. Our telephone transmission network contains some \$40 billion worth of hardware. We can't be expected to scrap it for your convenience.

WHEN CUSTOMERS HAVE CARRY-ALONG PHONES,
WHY SHOULD THEY HAVE THEIR OWN FIXED
EXTENSIONS?

That attitude was not unwarranted at the time. But now, with computers becoming almost as common as Cuisinarts, things are different, so Bell is carrying more and more of its voice traffic in the same digital form understood by computers. As well as being far-sighted, digital voice transmission has the advantages of low cost and high message-per-channel efficiency. A technique called pulse code modulation converts sound into the same electronic nuggets that computer instructions are made of. A clever microchip called a coder-decoder circuit has been tailored for precisely this purpose. We can expect to see such chips proliferate as Bell equips its Centrex office switching systems with the capacity to provide high-speed digital data transmission. Goodbye, modem. Simply plug a computer terminal into the phone lines and interface to your heart's content.

Light waves, with frequencies many thousands of times higher than radio waves, are a nearly perfect medium for digital data transmission. Sending information by light wave is not a new

technology (Alexander Graham Bell experimented successfully with sunbeam communications in 1880), but under the influence of microelectronics it has been vastly improved. The most promising current approach is called fiber optics, wherein messages once carried by electricity flowing through copper wires are transmitted by pulses of light zipping along hair-thin glass fibers. The superfine glass strands cost less to install and maintain than metallic cable systems, and may soon be cheaper to manufacture. But the new system's decisive advantage is that a single optical fiber can carry as much information as hundreds or even thousands of copper allocated to carrying videotex services, interactive cable television services, or even two-way TV traffic between subscribers--versatility that conventional coaxial cables could never provide.

THE NEW TECHNOLOGY'S PROGRESS appears inexorable. Bell completed the first leg of its interstate laser-powered telecommunications system, linking the Washington D.C., and New York metropolitan areas, earlier this year. The next two sections, from New York to Cambridge, Massachusetts, and south from Washington to Moseley, Virginia, should go on line in 1984. Bell has simply stopped laying any new copper wire at all in high-traffic locations like Los Angeles.

The new technology's promise has unleashed a land rush of investment. Developers of large commercial buildings are beginning to wire in data highways of optical fibers to give tenants direct access to the new system. A Brobdingnagian version of the same idea is Teleport, the \$300-million telecommunications facility planned for Staten Island. A joint venture of Merrill, Lynch, Pierce, Fenner & Smith, Inc., and the port authorities of New York and New Jersey, Teleport will utilize satellites and fiber optic cables for voice and data communications in the New York City metropolitan area. Since they're virtually unaffected by electromagnetic or radio wave interference, fiber optics could be strung inside power lines, opening up an entire new telecommunications market.

An equally revolutionary future is predicted for cellular radio, the technology that caused that traffic jam of trucks delivering operator's license applications to the FCC last June.

The term "cellular" refers to geography, not technology. Rather than relying on a single powerful transmitter to connect mobile-telephone users with regular telephone lines, a cellular system employs low-power transmitters that each serve a small area or "cell" ten or fifteen miles in radius with more than 300 channels. The limited range of each transmitter permits the same frequency to be used for simultaneous calls in different cells.

As a caller moves from one cell to another, a computer automatically switches the call to an unused frequency in that cell. AT&T has tested and proved the cellular system reliable in trials in the Chicago area since 1978. By subdividing the cells when volume of calls increases, the system can handle virtually infinite number of calls simultaneously. Unlike current radio-telephones, cellular's voice quality is as good as on present telephones, and all the features you now have--call forwarding, call waiting, automatic redial, and the rest--will be available.

(Continued...)

THE SHAPE OF RINGS TO COME (Continued):

Such a system would be larger and much more sophisticated than the automobile telephone systems now in existence. And demand for even today's expensive radiotelephone service, bought mostly by business, far exceeds capacity.

The cellular challenge to existing systems is dramatic. In New York City, for example, only 12 of the Bell system's 700 mobile telephone customers can now make calls at the same time. That means few customers ever get immediate service. Bell estimates that its proposed new cellular service in the city could ultimately handle thousands of simultaneous calls for up to 200,000 customers.

The 160,000 mobile telephones now in use in the U.S. represent only a tiny fraction of the automobile market, approximately one-tenth of one percent of the cars on the road. Based on AT&T data and assuming subscription by less than three percent of the automobile market during the first eight years, industry observers expect cellular to earn nearly double the return per dollar invested of any communications technology. Considering cellular's full potential uses other than as a mobile phone for automobile users, the figures look better still. Although cellular initially will be limited to car phones, hand-held pocket-sized portable phones are expected to become available by the end of the decade.

AT&T hopes to have its first permanent system operating in the fall of this year. Other applicants are aiming for late 1983 and 1984. As estimates stand now, cellular service will cost customers between \$100 and \$150 a month, a rate compatible with the cost of conventional mobile communications. The cost of a mobile telephone, now \$2,000, is expected to drop sharply.

In a few years, cellular systems are slated to serve the 300 largest U.S. cities, encompassing effectively the entire population. Whether you're walking down the street, strolling in a park, driving your car, or lying on a beach you'll be able to place a call to almost anywhere. Eventually, the cellular phone may replace the desk phone because it's so convenient. When customers have carry-along phones, why should they own fixed extensions?

THE NATION'S TELEPHONE SYSTEM is clearly ringing in a new era. America's electronic reindustrialization, its initial impact acknowledged but by no means deeply understood, is accelerating. Very little about the landscape of our lives will look the same when it has run its course. Will we turn to our advantage the flood of information the new technologies bring to our doorstep, or will it overwhelm us? That is the question.

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BITS & PIECES

—Ruth Michalecki, Nebraska

The future of automated offices should prove very interesting in light of the recent announcement that IBM has purchased 15% of Rolm. At the same time IBM and Mitel cancelled their joint venture plans. The joint efforts of Rolm and IBM should assure the long-heralded integrated voice/data information management systems will happen!

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AT&T has requested approval of a 'test-case' for interstate long distance rate structure to help them determine whether discounts better meet customer needs and provide more efficient use of the telecommunications network by stimulating calling during low-use periods. In Nevada, AT&T proposes to offer 20% discount 8-9am; noon-1pm; and 4-5pm, Monday thru Friday. In North Dakota, they are asking for an 80% discount midnight-7am daily, with a reduction in the 9am-noon Saturday discount from 60% to 40%. The test case is for those two states only and will apply only to calls originating in the two states---non-coin and non-operator handled calls to any location in the United States, Puerto Rico and the U.S. Virgin Islands.... Does this sound like AT&T's first answer to the resale market, in addition to the increases in WATS and private lines???

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In this month's issue of Communication News, read at least two very thought-provoking articles on the PBX Industry and on doing your own thing. The first article is "PBX Industry on Verge of Some Large Changes", by Gregory Blundell of the Eastern Management Group. The second article is "Chase Takes Telecom Matters into Own Hands for Total Do-It-Themselves Approach". This is about the decision of Chase Manhattan Bank to run their own telecommunications system. In doing so, they estimate achieving a quarter million savings monthly, and enjoying the flexibility and control of their own network as never before. They engineered, purchased, installed and now maintain their total network. Samuel Johnston, 2nd Vice President, Chase Manhattan Consumer Telecommunications Division, has an article in the same issue where he speaks of the advantages of getting away from the 'utility syndrome'.... Well worth your time to read both articles. Also in the same issue of Communications News, take the time to read some of the items covered at the ICA conference---and on page 65 is a photo of our very own Region II Director (Norm Sefton) at the ICA....

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We have been heavily involved in our Student Sharing of Long Distance Project for most of the summer. It has been a time-consuming activity, but we are ready to roll and when our students return to campus this August, our project will begin. In November, ACUTA is offering Profit Center Management in Berkeley, California. If anyone is seriously considering resale, I would strongly advise you to attend this seminar. I would have been lost without the information I learned at this seminar in New Orleans. So many things you need to look at; how to put your proposal together; potential problem areas and so many others. The management consultant team from Touche-Ross knew their business!

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....."Human behavior flows from three main sources: desire, emotion and knowledge."

-----Plato